SEQUENCE LISTING

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<120> NEMATODE-EXTRACTED SERINE PROTEASE INHIBITORS AND ANTICOAGULANT PROTEIN

<130> 018813/0272487

<140> 09/498,556
<141> 2000-04-02

<150> 08/809,455
<151> 1997-04-17

<150> PCT/US95/13231
<151> 1995-10-17

<150> 08/486,399
<151> 1995-06-05

<150> 08/486,397
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<150> 08/465,380
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<150> 08/461,965
<151> 1995-06-05

<150> 08/326,110
<151> 1994-10-18

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<170> PatentIn version 3.1

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tgcgaggcca agtgcaatga ggaacccccc gaggaggaag atccgatatg ccgctcacgt 120

ggttgtttat tacctcctgc ttgcgtatgc aaagacggat tctacagaga cacggtgatc 180

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ccgggtcccg ctgcttgcgt atgcgaagac ggattctaca gagacacggt gatcggcgac 180

tgtgttaagg aagaagaatg cgaccaacat gagattatac atgtctga 228

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                        1               5                   10
ttt ctc ctg gta tca tta tgc agc gca aga aca gtg agg aag gca tac 99
Phe Leu Leu Val Ser Leu Cys Ser Ala Arg Thr Val Arg Lys Ala Tyr
                15                  20                  25
ccg gag tgt ggt gag aat gaa tgg ctc gac gac tgt gga act cag aag 147
Pro Glu Cys Gly Glu Asn Glu Trp Leu Asp Asp Cys Gly Thr Gln Lys
            30                  35                  40
cca tgc gag gcc aag tgc aat gag gaa ccc cct gag gag gaa gat ccg 195
Pro Cys Glu Ala Lys Cys Asn Glu Glu Pro Pro Glu Glu Glu Asp Pro
        45                  50                  55
ata tgc cgc tca cgt ggt tgt tta tta cct cct gct tgc gta tgc aaa 243
Ile Cys Arg Ser Arg Gly Cys Leu Leu Pro Pro Ala Cys Val Cys Lys
    60                  65                  70
gac gga ttc tac aga gac acg gtg atc ggc gac tgt gtt agg gaa gaa 291
Asp Gly Phe Tyr Arg Asp Thr Val Ile Gly Asp Cys Val Arg Glu Glu
75                  80                  85                  90
gaa tgc gac caa cat gag att ata cat gtc tgaacgagaaa gcaacaataacc 344
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Glu Cys Asp Gln His Glu Ile Ile His Val
                95                  100
aaaggttcca actctcgctc tgcaaaatcg ctagttggat gtctcttttg cgtccgaata 404
gttttagttg atgttaagta agaactcctg ctggagagaa taaagctttc caactcc    461


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<400>  4

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1               5                   10
Cys Gly Thr Gln Lys Pro Cys Glu Ala Lys Cys Asn Glu Glu
15                  20                  25
Pro Pro Glu Glu Glu Asp Pro Ile Cys Arg Ser Arg Gly Cys
    30                  35                  40
Leu Leu Pro Pro Ala Cys Val Cys Lys Asp Gly Phe Tyr Arg
        45                  50                  55
Asp Thr Val Ile Gly Asp Cys Val Arg Glu Glu Glu Cys Asp
            60                  65                  70
Gln His Glu Ile Ile His Val
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<222>  (22)..(315)

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                        1               5                   10
ttt ctc ctg gtg tca tta tgc agc aca aga aca gtg agg aag gca tac   99
Phe Leu Leu Val Ser Leu Cys Ser Thr Arg Thr Val Arg Lys Ala Tyr
                15                  20                  25
ccg gag tgt ggt gag aat gaa tgg ctc gac gtc tgt gga act aag aag   147
Pro Glu Cys Gly Glu Asn Glu Trp Leu Asp Val Cys Gly Thr Lys Lys
            30                  35                  40
cca tgc gag gcc aag tgc agt gag gaa gag gag gaa gat ccg ata tgc   195
Pro Cys Glu Ala Lys Cys Ser Glu Glu Glu Glu Glu Asp Pro Ile Cys
        45                  50                  55
cga tca ttt tct tgt ccg ggt ccc gct gct tgc gta tgc gaa gac gga   243
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Arg Ser Phe Ser Cys Pro Gly Pro Ala Ala Cys Val Cys Glu Asp Gly
     60                  65                  70
ttc tac aga gac acg gtg atc ggc gac tgt gtt aag gaa gaa gaa tgc   291
Phe Tyr Arg Asp Thr Val Ile Gly Asp Cys Val Lys Glu Glu Glu Cys
75                  80                  85                  90
gac caa cat gag att att cat gtc tgaacgagag agcagtaata accaaaggttc 346
Asp Gln His Glu Ile Ile His Val
                 95
caactttcgc tctacaaaat cgctagttgg atttctcctt tgcgtgcgaa tagttttagt 406

tgatattaag taaaacctcc tgttgaagag aataaagctt tccaacttc             455


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<213>  Ascyclostoma caninum

<400>  6

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Thr Lys Lys Pro Cys Glu Ala Lys Cys Ser Glu Glu Glu Glu Glu Asp
            20                  25                  30
Pro Ile Cys Arg Ser Phe Ser Cys Pro Gly Pro Ala Ala Cys Val Cys
        35                  40                  45
Glu Asp Gly Phe Tyr Arg Asp Thr Val Ile Gly Asp Cys Val Lys Glu
     50                  55                  60
Glu Glu Cys Asp Gln His Glu Ile Ile His Val
65                  70                  75


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<213>  Ascyclostoma caninum

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Asp Asp Cys Gly Thr Gln Lys Pro Cys Glu Ala Lys Cys Asn Glu Glu
            20                  25                  30
Pro Pro Glu Glu Glu Asp Pro Ile Cys Arg Ser Arg Gly Cys Leu Leu
        35                  40                  45
Pro Pro Ala Cys Val Cys Lys Asp Gly Phe Tyr Arg Asp Thr Val Ile
     50                  55                  60
Gly Asp Cys Val Arg Glu Glu Glu Cys Asp Gln His Glu Ile Ile His
65                  70                  75                  80
Val
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<210> 8
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 1               5                  10                  15
Asp Val Cys Gly Thr Lys Lys Pro Cys Glu Ala Lys Cys Ser Glu Glu
            20                  25                  30
Glu Glu Glu Asp Pro Ile Cys Arg Ser Phe Ser Cys Pro Gly Pro Ala
        35                  40                  45
Ala Cys Val Cys Glu Asp Gly Phe Tyr Arg Asp Thr Val Ile Gly Asp
    50                  55                  60
Cys Val Lys Glu Glu Glu Cys Asp Gln His Glu Ile Ile His Val
65                  70                  75
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<210> 9
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<213> Ancyclostoma ceylanicum

<220>
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                        1               5                  10
tta cta ctg gta tca caa tgc agt ggg aaa ccg aac aat gtg atg act   98
Leu Leu Leu Val Ser Gln Cys Ser Gly Lys Pro Asn Asn Val Met Thr
                15                  20                  25
aac gct tgt ggt ctt aat gaa tat ttc gct gag tgt ggc aat atg aag   146
Asn Ala Cys Gly Leu Asn Glu Tyr Phe Ala Glu Cys Gly Asn Met Lys
            30                  35                  40
gaa tgc gag cac aga tgc aat gag gag gaa aat gag gaa agg gac gag   194
Glu Cys Glu His Arg Cys Asn Glu Glu Glu Asn Glu Glu Arg Asp Glu
        45                  50                  55
gaa aga ata acg gca tgc ctc atc cgt gtg tgt ttc cgt cct ggt gct   242
Glu Arg Ile Thr Ala Cys Leu Ile Arg Val Cys Phe Arg Pro Gly Ala
    60                  65                  70
tgc gta tgc aaa gac gga ttc tat aga aac aga aca ggc agc tgt gtg   290
Cys Val Cys Lys Asp Gly Phe Tyr Arg Asn Arg Thr Gly Ser Cys Val
 75                  80                  85                  90
gaa gaa gat gac tgc gag tac gag aat atg gag ttc att act ttt gca   338
Glu Glu Asp Asp Cys Glu Tyr Glu Asn Met Glu Phe Ile Thr Phe Ala
                95                  100                 105
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cca gaa gta ccg ata tgt ggt tcc aac gaa agg tac tcc gac tgc ggc  386
Pro Glu Val Pro Ile Cys Gly Ser Asn Glu Arg Tyr Ser Asp Cys Gly
            110                 115                 120
aat gac aaa caa tgc gag cgc aaa tgc aac gag gac gat tat gag aag   434
Asn Asp Lys Gln Cys Glu Arg Lys Cys Asn Glu Asp Asp Tyr Glu Lys
        125                 130                 135
gga gat gag gca tgc cgc tca cat gtt tgt gaa cgt cct ggt gcc tgt   482
Gly Asp Glu Ala Cys Arg Ser His Val Cys Glu Arg Pro Gly Ala Cys
    140                 145                 150
gta tgc gaa gac ggg ttc tac aga aac aaa aaa ggt agc tgt gtg gaa   530
Val Cys Glu Asp Gly Phe Tyr Arg Asn Lys Lys Gly Ser Cys Val Glu
155                 160                 165                 170
agc gat gac tgc gaa tac gat aat atg gat ttc atc act ttt gca cca   578
Ser Asp Asp Cys Glu Tyr Asp Asn Met Asp Phe Ile Thr Phe Ala Pro
                175                 180                 185
gaa acc tca cga taaccaaaga tgctacctct cgtacgcaac tccgctgatt gaggtt 636
Glu Thr Ser Arg
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gattcactcc cttgcatctc aacatttttt ttgtgatgct gtgcatctga gcttaacctg 696

ataaagccta tggtg                                                  711


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<213>  Ancyclostoma ceylanicum

<220>
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<222>  (10)..(291)

<220>
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          1               5                   10
tcg caa tgt aat gga aaa gca ttc ccg aaa tgt gac gtc aat gaa aga     99
Ser Gln Cys Asn Gly Lys Ala Phe Pro Lys Cys Asp Val Asn Glu Arg
15                  20                  25                  30
ttc gag gtg tgt ggc aat ctg aag gag tgc gag ctc aag tgc gat gag    147
Phe Glu Val Cys Gly Asn Leu Lys Glu Cys Glu Leu Lys Cys Asp Glu
                35                  40                  45
gac cct aag ata tgc tct cgt gca tgt att cgt ccc cct gct tgc gta    195
Asp Pro Lys Ile Cys Ser Arg Ala Cys Ile Arg Pro Pro Ala Cys Val
            50                  55                  60
tgc gat gac gga ttc tac aga gac aaa tat ggc ttc tgt gtt gaa gaa    243
Cys Asp Asp Gly Phe Tyr Arg Asp Lys Tyr Gly Phe Cys Val Glu Glu
        65                  70                  75
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gac gaa tgt aac gat atg gag att att act ttt cca cca gaa acc aaa tg 293
Asp Glu Cys Asn Asp Met Glu Ile Ile Thr Phe Pro Pro Glu Thr Lys
    80                  85                  90
atgaccgaag cttccacctt tctatacata tcttcactgc ttgacaggct tctcgacaat  353
ttagaagttc tgcttgactt tgtctatttg aaattgttca cactaatggg ggaagtaaag  413
cattttcacg ac                                                      425


<210>  11
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<213>  Ancyclostoma ceylanicum

<220>
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<222>  (23)..(237)

<220>
<221>  MOD_RES
<223>  Recombinant cDNA Molecule AceNAP7 sequence

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                        1               5                   10
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Leu Leu Leu Val Ser Gln Cys Asn Gly Arg Thr Val Lys Lys Cys Gly
                15                  20                  25
aag aat gaa aga tac gac gac tgt ggc aat gca aag gac tgc gag acc    148
Lys Asn Glu Arg Tyr Asp Asp Cys Gly Asn Ala Lys Asp Cys Glu Thr
            30                  35                  40
aag tgc ggt gaa gag gaa aag gtg tgc cgt tcg cgt gag tgt act agt    196
Lys Cys Gly Glu Glu Glu Lys Val Cys Arg Ser Arg Glu Cys Thr Ser
        45                  50                  55
cct ggt gcc tgc gta tgc gaa caa gga ttc tac aga gat ccg gct ggc    244
Pro Gly Ala Cys Val Cys Glu Gln Gly Phe Tyr Arg Asp Pro Ala Gly
    60                  65                  70
gac tgt gtc act gat gaa gaa tgt gat gaa tgg aac aat atg gag atc    292
Asp Cys Val Thr Asp Glu Glu Cys Asp Glu Trp Asn Asn Met Glu Ile
75                  80                  85                  90
att act atg cca aaa cag tagtgcgaag ttcccttctt tctccaaatc tgctccgtg 349
Ile Thr Met Pro Lys Gln
                95
ctcaattatc acacacctcc actagttaag attgactgac tctcttgcat tgtagtattt  409
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ac                                                                 471
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<210> 12
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<212> DNA
<213> Ancyclostoma duodenale

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aag cat tgc gaa ctc aag tgc gat agg gag cta act gag aaa gaa gag     99
Lys His Cys Glu Leu Lys Cys Asp Arg Glu Leu Thr Glu Lys Glu Glu
15                  20                  25                  30
cag gca tgt ctc tca cgt gtt tgt gag aag tcc gct tgc gta tgc aat     147
Gln Ala Cys Leu Ser Arg Val Cys Glu Lys Ser Ala Cys Val Cys Asn
                35                  40                  45
gac gga tta tac aga gac aag ttt ggc aac tgt gtt gaa aaa gac gaa     195
Asp Gly Leu Tyr Arg Asp Lys Phe Gly Asn Cys Val Glu Lys Asp Glu
            50                  55                  60
tgc aac gat atg gag att att act ttt gca cca gaa acc aaa taatggccta  247
Cys Asn Asp Met Glu Ile Ile Thr Phe Ala Pro Glu Thr Lys
        65                  70                  75
aggttccaaa ccttgctaca caccgtcagt gctttactgt ttcctctacg tgttagtagt   307
tttgcttgac tctgtgtatt taagcattgt ctactaatgg gcaaagtaaa gcattgtaag   367
gacataataa tgagtaaacc ttctgattt                                    396
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<223> Recombinant cDNA Molecule AduNAP7 sequence

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                       1               5                  10
ttg ctg ctc att tcg cta tgc agt gga aaa gct gcg aag aaa tgt ggt  98
Leu Leu Leu Ile Ser Leu Cys Ser Gly Lys Ala Ala Lys Lys Cys Gly
                15                  20                  25
ctc aat gaa agg ctg gac tgt ggc aat ctg aag caa tgc gag ccc aag  146
Leu Asn Glu Arg Leu Asp Cys Gly Asn Leu Lys Gln Cys Glu Pro Lys
            30                  35                  40
tgc agc gac ttg gaa agt gag gag tat gag gag gaa gat gag tcg aaa  194
Cys Ser Asp Leu Glu Ser Glu Glu Tyr Glu Glu Glu Asp Glu Ser Lys
        45                  50                  55
tgt cga tca cgt gaa tgt tct cgt cgt gtt tgt gta tgc gat gaa gga  242
Cys Arg Ser Arg Glu Cys Ser Arg Arg Val Cys Val Cys Asp Glu Gly
    60                  65                  70
ttc tac aga aac aag aag ggc aag tgt gtt gca aaa gat gtt tgc gag  290
Phe Tyr Arg Asn Lys Lys Gly Lys Cys Val Ala Lys Asp Val Cys Glu
75                  80                  85                  90
gac gac aat atg gag att atc act ttt cca cca gaa gac gaa tgt ggt  338
Asp Asp Asn Met Glu Ile Ile Thr Phe Pro Pro Glu Asp Glu Cys Gly
                95                  100                 105
ccc gat gaa tgg ttc gac tac tgt gga aat tat aag aag tgc gaa cgc  386
Pro Asp Glu Trp Phe Asp Tyr Cys Gly Asn Tyr Lys Lys Cys Glu Arg
            110                 115                 120
aag tgc agt gag gag aca agt gag aaa aat gag gag gca tgc ctc tct  434
Lys Cys Ser Glu Glu Thr Ser Glu Lys Asn Glu Glu Ala Cys Leu Ser
        125                 130                 135
cgt gct tgt act ggt cgt gct tgc gta tgc aaa gac gga ttg tac aga  482
Arg Ala Cys Thr Gly Arg Ala Cys Val Cys Lys Asp Gly Leu Tyr Arg
    140                 145                 150
gac gac ttt ggc aac tgt gtt cca cat gac gaa tgc aac gat atg gag  530
Asp Asp Phe Gly Asn Cys Val Pro His Asp Glu Cys Asn Asp Met Glu
155                 160                 165                 170
atc atc act ttt cca ccg gaa acc aaa cat tgaccagagg ctccaactct cgct 584
Ile Ile Thr Phe Pro Pro Glu Thr Lys His
                175                 180
acacaacgtc agggctagaa tggcccctct gcgagttagt agttttgctt gactctgctt 644
atttgagcac tttctattga tggcgaaaat aaagcattta aaac                  688
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<210> 14
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<213> Heligmosomoides polygyrus

<220>
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<222> (49)..(276)

<220>
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                                                        Met Ile Arg
                                                        1
aag ctc gtt ctg ctg act gct atc gtc acg gtg gtg cta agt gcg aag     105
Lys Leu Val Leu Leu Thr Ala Ile Val Thr Val Val Leu Ser Ala Lys
    5                   10                  15
acc tgt gga cca aac gag gag tac act gaa tgc ggg acg cca tgc gag     153
Thr Cys Gly Pro Asn Glu Glu Tyr Thr Glu Cys Gly Thr Pro Cys Glu
20                  25                  30                  35
ccg aag tgc aat gaa ccg atg cca gac atc tgt act ctg aac tgc atc     201
Pro Lys Cys Asn Glu Pro Met Pro Asp Ile Cys Thr Leu Asn Cys Ile
                40                  45                  50
gtg aac gtg tgt cag tgc aaa ccc ggc ttc aag cgc gga ccg aaa gga     249
Val Asn Val Cys Gln Cys Lys Pro Gly Phe Lys Arg Gly Pro Lys Gly
            55                  60                  65
tgc gtc gcc ccc gga cca ggc tgt aaa tagttctcca cctgcccttt cgttggaa 304
Cys Val Ala Pro Gly Pro Gly Cys Lys
        70                  75
caaatggctg tctttttaca ttctgaatca ataaagccga acggt                   349
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<212> DNA
<213> Heligmosomoides polygyrus

<220>
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<223> pDONG61 vector sequence

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                                           Met Pro Val Leu Leu
                                            1               5
ggt att ccg tta tta ttg cgt ttc ctc ggt ttc ctt ctg gta act ttg   102
Gly Ile Pro Leu Leu Leu Arg Phe Leu Gly Phe Leu Leu Val Thr Leu
                10                  15                  20
ttc ggc tat ctg ctt act ttc ctt aaa aag ggc ttc ggt aag ata gct   150
Phe Gly Tyr Leu Leu Thr Phe Leu Lys Lys Gly Phe Gly Lys Ile Ala
            25                  30                  35
att gct att tca ttg ttt ctt gct ctt att att ggg ctt aac tca att   198
Ile Ala Ile Ser Leu Phe Leu Ala Leu Ile Ile Gly Leu Asn Ser Ile
        40                  45                  50
ctt gtg ggt tat ctc tct gat att agc gca caa tta ccc tct gat ttt   246
Leu Val Gly Tyr Leu Ser Asp Ile Ser Ala Gln Leu Pro Ser Asp Phe
    55                  60                  65
gtt cag ggc gtt cag tta att ctc ccg tct aat gcg ctt ccc tgt ttt   294
Val Gln Gly Val Gln Leu Ile Leu Pro Ser Asn Ala Leu Pro Cys Phe
70                  75                  80                  85
tat gtt att ctc tct gta aag gct gct att ttc att ttt gac gtt aaa   342
Tyr Val Ile Leu Ser Val Lys Ala Ala Ile Phe Ile Phe Asp Val Lys
                90                  95                  100
caa aaa atc gtt tct tat ttg gat tgg gat aaa ggt gga ggc tca ggc   390
Gln Lys Ile Val Ser Tyr Leu Asp Trp Asp Lys Gly Gly Gly Ser Gly
            105                 110                 115
gga ggccaagtcg gccatcccat atcacgcggc cgcggatcc                   432
Gly
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<210> 16
<211> 433
<212> DNA
<213> Heligmosomoides polygyrus

<220>
<221> CDS
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<220>
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<223> pDONG62 vector sequence

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                                           Met Pro Val Leu Leu
                                            1               5
ggt att ccg tta tta ttg cgt ttc ctc ggt ttc ctt ctg gta act ttg   102
Gly Ile Pro Leu Leu Leu Arg Phe Leu Gly Phe Leu Leu Val Thr Leu
                10                  15                  20
ttc ggc tat ctg ctt act ttc ctt aaa aag ggc ttc ggt aag ata gct   150
Phe Gly Tyr Leu Leu Thr Phe Leu Lys Lys Gly Phe Gly Lys Ile Ala
            25                  30                  35
att gct att tca ttg ttt ctt gct ctt att att ggg ctt aac tca att   198
Ile Ala Ile Ser Leu Phe Leu Ala Leu Ile Ile Gly Leu Asn Ser Ile
        40                  45                  50
ctt gtg ggt tat ctc tct gat att agc gca caa tta ccc tct gat ttt   246
Leu Val Gly Tyr Leu Ser Asp Ile Ser Ala Gln Leu Pro Ser Asp Phe
    55                  60                  65
gtt cag ggc gtt cag tta att ctc ccg tct aat gcg ctt ccc tgt ttt   294
Val Gln Gly Val Gln Leu Ile Leu Pro Ser Asn Ala Leu Pro Cys Phe
70                  75                  80                  85
tat gtt att ctc tct gta aag gct gct att ttc att ttt gac gtt aaa   342
Tyr Val Ile Leu Ser Val Lys Ala Ala Ile Phe Ile Phe Asp Val Lys
                90                  95                  100
caa aaa atc gtt tct tat ttg gat tgg gat aaa ggt gga ggc tca ggc   390
Gln Lys Ile Val Ser Tyr Leu Asp Trp Asp Lys Gly Gly Gly Ser Gly
            105                 110                 115
gga gggccaagtc ggccatccca tatcacgcgg ccgcggatcc                   433
Gly
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<210> 17
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<212> DNA
<213> Heligmosomoides polygyrus

<220>
<221> CDS
<222> (140)..(291)

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                                           Met Pro Val Leu Leu
                                            1               5
ggt att ccg tta tta ttg cgt ttc ctc ggt ttc ctt ctg gta act ttg   102
Gly Ile Pro Leu Leu Leu Arg Phe Leu Gly Phe Leu Leu Val Thr Leu
                10                  15                  20
ttc ggc tat ctg ctt act ttc ctt aaa aag ggc ttc ggt aag ata gct   150
Phe Gly Tyr Leu Leu Thr Phe Leu Lys Lys Gly Phe Gly Lys Ile Ala
            25                  30                  35
att gct att tca ttg ttt ctt gct ctt att att ggg ctt aac tca att   198
Ile Ala Ile Ser Leu Phe Leu Ala Leu Ile Ile Gly Leu Asn Ser Ile
        40                  45                  50
ctt gtg ggt tat ctc tct gat att agc gca caa tta ccc tct gat ttt   246
Leu Val Gly Tyr Leu Ser Asp Ile Ser Ala Gln Leu Pro Ser Asp Phe
    55                  60                  65
gtt cag ggc gtt cag tta att ctc ccg tct aat gcg ctt ccc tgt ttt   294
Val Gln Gly Val Gln Leu Ile Leu Pro Ser Asn Ala Leu Pro Cys Phe
70                  75                  80                  85
tat gtt att ctc tct gta aag gct gct att ttc att ttt gac gtt aaa   342
Tyr Val Ile Leu Ser Val Lys Ala Ala Ile Phe Ile Phe Asp Val Lys
                90                  95                  100
caa aaa atc gtt tct tat ttg gat tgg gat aaa ggt gga ggc tca ggc   390
Gln Lys Ile Val Ser Tyr Leu Asp Trp Asp Lys Gly Gly Gly Ser Gly
            105                 110                 115
gga tcggccaagt cggccatccc atatcacgcg gccgcggatc c                 434
Gly
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<210> 18
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<221> misc_feature
<223> Description of Artificial Sequence: pDONG vector linker sequence

<400> 18

Gly Gly Gly Ser Gly Gly
 1   5

<210> 19
<211> 430
<212> DNA
<213> Ancyclostoma ceylanicum

<220>
<221> CDS
<222> (10)..(282)

<220>
<221> MOD_RES
<223> "w" stands for a or t

<400> 19

gaattccgg ctg gtw tcc tac tgc agt gga aaa gca acg atg cag tgt ggt 51
          Leu Val Ser Tyr Cys Ser Gly Lys Ala Thr Met Gln Cys Gly
           1   5   10
gag aat gaa aag tac gat tcg tgc ggt agc aag gag tgc gat aag aag   99
Glu Asn Glu Lys Tyr Asp Ser Cys Gly Ser Lys Glu Cys Asp Lys Lys
15   20   25   30
tgc aaa tat gac gga gtt gag gag gaa gac gac gag gaa cct aat gtg   147
Cys Lys Tyr Asp Gly Val Glu Glu Glu Asp Asp Glu Glu Pro Asn Val
                35   40   45
cca tgc cta gta cgt gtg tgt cat caa gat tgc gta tgc gaa gaa gga   195
Pro Cys Leu Val Arg Val Cys His Gln Asp Cys Val Cys Glu Glu Gly
            50   55   60
ttc tat aga aac aaa gat gac aaa tgt gta tca gca gaa gag tgc gaa   243
Phe Tyr Arg Asn Lys Asp Asp Lys Cys Val Ser Ala Glu Asp Cys Glu
        65   70   75
ctt gac aat atg gac ttt ata tat ccc gga act cga aac tgaacgaaggctc 295
Leu Asp Asn Met Asp Phe Ile Tyr Pro Gly Thr Arg Asn
    80   85   90
cattcttgct gcacaagatc gattgtctct cccctgcatc tcagtagttt tgctacattg 355

tatatggtag caaaaaatta gcttagggag aataaaatct ttacctatat ttaatcaatg 415

aagtattctc tttct   430

<210> 20
<211> 100
<212> PRT
<213> Ancyclostoma caninum

<400> 20

```
Met Lys Met Leu Tyr Ala Ile Ala Ile Met Phe Leu Leu Val Ser Leu
 1               5                  10                  15
Cys Ser Ala Arg Thr Val Arg Lys Ala Tyr Pro Glu Cys Gly Glu Asn
            20                  25                  30
Glu Trp Leu Asp Asp Cys Gly Thr Gln Lys Pro Cys Glu Ala Lys Cys
        35                  40                  45
Asn Glu Glu Pro Pro Glu Glu Glu Asp Pro Ile Cys Arg Ser Arg Gly
    50                  55                  60
Cys Leu Leu Pro Pro Ala Cys Val Cys Lys Asp Gly Phe Tyr Arg Asp
65                  70                  75                  80
Thr Val Ile Gly Asp Cys Val Arg Glu Glu Glu Cys Asp Gln His Glu
                85                  90                  95
Ile Ile His Val
            100
```

<210> 21
<211> 98
<212> PRT
<213> Ancyclostoma caninum

<400> 21

```
Met Lys Met Leu Tyr Ala Ile Ala Ile Met Phe Leu Leu Val Ser Leu
 1               5                  10                  15
Cys Ser Thr Arg Thr Val Arg Lys Ala Tyr Pro Glu Cys Gly Glu Asn
            20                  25                  30
Glu Trp Leu Asp Val Cys Gly Thr Lys Lys Pro Cys Glu Ala Lys Cys
        35                  40                  45
Ser Glu Glu Glu Glu Glu Asp Pro Ile Cys Arg Ser Phe Ser Cys Pro
    50                  55                  60
Gly Pro Ala Ala Cys Val Cys Glu Asp Gly Phe Tyr Arg Asp Thr Val
65                  70                  75                  80
Ile Gly Asp Cys Val Lys Glu Glu Glu Cys Asp Gln His Glu Ile Ile
                85                  90                  95
His Val
```

<210> 22
<211> 94
<212> PRT
<213> Ancyclostoma ceylanicum

<400> 22

```
Met Arg Thr Leu Tyr Leu Ile Ser Ile Trp Leu Phe Leu Ile Ser Gln
 1               5                  10                  15
Cys Asn Gly Lys Ala Phe Pro Lys Cys Asp Val Asn Glu Arg Phe Glu
            20                  25                  30
Val Cys Gly Asn Leu Lys Glu Cys Glu Leu Lys Cys Asp Glu Asp Pro
        35                  40                  45
Lys Ile Cys Ser Arg Ala Cys Ile Arg Pro Pro Ala Cys Val Cys Asp
    50                  55                  60
Asp Gly Phe Tyr Arg Asp Lys Tyr Gly Phe Cys Val Glu Glu Asp Glu
65                  70                  75                  80
Cys Asn Asp Met Glu Ile Ile Thr Phe Pro Pro Glu Thr Lys
                85                  90
```

<210> 23
<211> 96
<212> PRT
<213> Ancyclostoma ceylanicum

<400> 23

```
Met Ser Thr Leu Tyr Val Ile Ala Ile Cys Leu Leu Leu Val Ser Gln
 1               5                  10                  15
Cys Asn Gly Arg Thr Val Lys Lys Cys Gly Lys Asn Glu Arg Tyr Asp
            20                  25                  30
Asp Cys Gly Asn Ala Lys Asp Cys Glu Thr Lys Cys Gly Glu Glu Glu
        35                  40                  45
Lys Val Cys Arg Ser Arg Glu Cys Thr Ser Pro Gly Ala Cys Val Cys
    50                  55                  60
Glu Gln Gly Phe Tyr Arg Asp Pro Ala Gly Asp Cys Val Thr Asp Glu
65                  70                  75                  80
Glu Cys Asp Glu Trp Asn Asn Met Glu Ile Ile Thr Met Pro Lys Gln
                85                  90                  95
```

<210> 24
<211> 108
<212> PRT
<213> Ancyclostoma ceylanicum

<400> 24

Met Ala Val Leu Tyr Ser Val Ala Ile Ala Leu Leu Leu Val Ser Gln
1 5 10 15
Cys Ser Gly Lys Pro Asn Asn Val Met Thr Asn Ala Cys Gly Leu Asn
20 25 30
Glu Tyr Phe Ala Glu Cys Gly Asn Met Lys Glu Cys Glu His Arg Cys
35 40 45
Asn Glu Glu Glu Asn Glu Glu Arg Asp Glu Glu Arg Ile Thr Ala Cys
50 55 60
Leu Ile Arg Val Cys Phe Arg Pro Gly Ala Cys Val Cys Lys Asp Gly
65 70 75 80
Phe Tyr Arg Asn Arg Thr Gly Ser Cys Val Glu Glu Asp Asp Cys Glu
85 90 95
Tyr Glu Asn Met Glu Phe Ile Thr Phe Ala Pro Glu
100 105

<210> 25
<211> 82
<212> PRT
<213> Ancyclostoma ceylanicum

<400> 25

Val Pro Ile Cys Gly Ser Asn Glu Arg Tyr Ser Asp Cys Gly Asn Asp
1 5 10 15
Lys Gln Cys Glu Arg Lys Cys Asn Glu Asp Asp Tyr Glu Lys Gly Asp
20 25 30
Glu Ala Cys Arg Ser His Val Cys Glu Arg Pro Gly Ala Cys Val Cys
35 40 45
Glu Asp Gly Phe Tyr Arg Asn Lys Lys Gly Ser Cys Val Glu Ser Asp
50 55 60
Asp Cys Glu Tyr Asp Asn Met Asp Phe Ile Thr Phe Ala Pro Glu Thr
65 70 75 80
Ser Arg

<210> 26
<211> 75
<212> PRT
<213> Ancyclostoma duodenale

<400> 26

```
Lys Cys Pro Thr Asp Glu Trp Phe Asp Trp Cys Gly Thr Tyr Lys His
 1               5                  10                  15
Cys Glu Leu Lys Cys Asp Arg Glu Leu Thr Glu Glu Glu Gln Ala Cys
            20                  25                  30
Leu Ser Arg Val Cys Glu Lys Ser Ala Cys Val Cys Asn Asp Gly Leu
        35                  40                  45
Tyr Arg Asp Lys Phe Gly Asn Cys Val Glu Lys Asp Glu Cys Asn Asp
    50                  55                  60
Met Glu Ile Ile Thr Phe Ala Pro Glu Thr Lys
65                  70                  75
```

<210> 27
<211> 102
<212> PRT
<213> Ancyclostoma duodenale

<400> 27

```
Met Arg Met Leu Tyr Leu Val Pro Ile Trp Leu Leu Leu Ile Ser Leu
 1               5                  10                  15
Cys Ser Gly Lys Ala Ala Lys Lys Cys Gly Leu Asn Glu Arg Leu Asp
            20                  25                  30
Cys Gly Asn Leu Lys Gln Cys Glu Pro Lys Cys Ser Asp Leu Glu Ser
        35                  40                  45
Glu Glu Tyr Glu Glu Glu Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys
    50                  55                  60
Ser Arg Arg Val Cys Val Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys
65                  70                  75                  80
Gly Lys Cys Val Ala Lys Asp Val Cys Glu Asp Asp Asn Met Glu Ile
                85                  90                  95
Ile Thr Phe Pro Pro Glu
            100
```

<210> 28
<211> 78
<212> PRT
<213> Ancyclostoma duodenale

<400> 28

Asp Glu Cys Gly Pro Asp Glu Trp Phe Asp Tyr Cys Gly Asn Tyr Lys
1 5 10 15
Lys Cys Glu Arg Lys Cys Ser Glu Glu Thr Ser Glu Lys Asn Glu Glu
20 25 30
Ala Cys Leu Ser Arg Ala Cys Thr Gly Arg Ala Cys Val Cys Lys Asp
35 40 45
Gly Leu Tyr Arg Asp Asp Phe Gly Asn Cys Val Pro His Asp Glu Cys
50 55 60
Asn Asp Met Glu Ile Ile Thr Phe Pro Pro Glu Thr Lys His
65 70 75

<210> 29
<211> 76
<212> PRT
<213> Helogmosomoides polygyrus

<400> 29

Met Ile Arg Lys Leu Val Leu Leu Thr Ala Ile Val Thr Val Val Leu
1 5 10 15
Ser Ala Lys Thr Cys Gly Pro Asn Glu Glu Tyr Thr Glu Cys Gly Thr
20 25 30
Pro Cys Glu Pro Lys Cys Asn Glu Pro Met Pro Asp Ile Cys Thr Leu
35 40 45
Asn Cys Ile Val Asn Val Cys Gln Cys Lys Pro Gly Phe Lys Arg Gly
50 55 60
Pro Lys Gly Cys Val Ala Pro Gly Pro Gly Cys Lys
65 70 75

<210> 30
<211> 187
<212> DNA
<213> Ancyclostoma caninum

<400> 30

ttattcgaaa cgatgttctc tccaattttg tccttggaaa ttattttagc tactttgcaa 60

tctgtcttcg cccagccagt tatctccact accgttggtt ccgctgccga gggttctttg 120

gacaagaggc ctatccgcgg aattcagatc tgaatgcggc cgctcgagac tagtggatcc 180

ttagaca 187

<210> 31
<211> 495
<212> DNA
<213> Ancyclostoma caninum

<220>
<221> CDS
<222> (36)..(356)

<220>
<221> MOD_RES
<223> Recombinant cDNA Molecule AcaNAP23 sequence

<400> 31

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gaattccgcg gaattccgct tgctactact caacg atg aag acg ctc tat att    53
                                        Met Lys Thr Leu Tyr Ile
                                         1               5
gtc gct ata tgc tcg ctc ctc att tcg ctg tgt act gga aaa cct tcg   101
Val Ala Ile Cys Ser Leu Leu Ile Ser Leu Cys Thr Gly Lys Pro Ser
            10                  15                  20
gag aaa gaa tgt ggt ccc cat gaa aga ctc gac tgt ggc aac aag aag   149
Glu Lys Glu Cys Gly Pro His Glu Arg Leu Asp Cys Gly Asn Lys Lys
        25                  30                  35
cca tgc gag cgc aag tgc aaa ata gag aca agt gag gag gag gat gac   197
Pro Cys Glu Arg Lys Cys Lys Ile Glu Thr Ser Glu Glu Glu Asp Asp
    40                  45                  50
tac gaa gag gga acc gaa cgt ttt cga tgc ctc tta cgt gtg tgt gat   245
Tyr Glu Glu Gly Thr Glu Arg Phe Arg Cys Leu Leu Arg Val Cys Asp
55                  60                  65                  70
cag cct tat gaa tgc ata tgc gat gat gga tac tac aga aac aag aaa   293
Gln Pro Tyr Glu Cys Ile Cys Asp Asp Gly Tyr Tyr Arg Asn Lys Lys
                75                  80                  85
ggc gaa tgt gtg act gat gat gta tgc cag gaa gac ttt atg gag ttt   341
Gly Glu Cys Val Thr Asp Asp Val Cys Gln Glu Asp Phe Met Glu Phe
            90                  95                  100
att act ttc gca cca taaacccaat aatgaccaat gactcccatt cttcgtgatcag 398
Ile Thr Phe Ala Pro
        105

cgtcggtggt tgacagtctc ccctacatct tagtagtttt gcttgataat gtatacataa 458

actgtacttt ctgagataga ataaagctct caactac                          495
```

<210> 32
<211> 478
<212> DNA
<213> Ancyclostoma caninum

<220>
<221> CDS
<222> (24)..(341)

<220>
<221> MOD_RES
<223> Recombinant cDNA Molecule AcaNAP24 sequence

<400> 32

```
gaattccgcg gaattccgca acg atg aag acg ctc tat att atc gct ata tgc 53
                        Met Lys Thr Leu Tyr Ile Ile Ala Ile Cys
                         1               5                  10
tcg ctc ctc att tcg ttg tgt act gga aga ccg gaa aaa aag tgc ggt   101
Ser Leu Leu Ile Ser Leu Cys Thr Gly Arg Pro Glu Lys Lys Cys Gly
                15                  20                  25
ccc ggt gaa aga ctc gcc tgt ggc aat aag aag cca tgc gag cgc aag   149
Pro Gly Glu Arg Leu Ala Cys Gly Asn Lys Lys Pro Cys Glu Arg Lys
            30                  35                  40
tgc aaa ata gag aca agt gag gag gag gat gac tac cca gag gga acc   197
Cys Lys Ile Glu Thr Ser Glu Glu Glu Asp Asp Tyr Pro Glu Gly Thr
        45                  50                  55
gaa cgt ttt cga tgc ctc tta cgt gtg tgt gat cag cct tat gaa tgc   245
Glu Arg Phe Arg Cys Leu Leu Arg Val Cys Asp Gln Pro Tyr Glu Cys
    60                  65                  70
ata tgc gat gat gga tac tac aga aac aag aaa ggc gaa tgt gtg act   293
Ile Cys Asp Asp Gly Tyr Tyr Arg Asn Lys Lys Gly Glu Cys Val Thr
75                  80                  85                  90
gat gat gta tgc cag gaa gac ttt atg gag ttt att act ttc gca cca   341
Asp Asp Val Cys Gln Glu Asp Phe Met Glu Phe Ile Thr Phe Ala Pro
                95                  100                 105
taaacccaat aatgaccact ggctcccatt cttcgtgacc agcgtcggtg gttgacagtc 401

tcccctgcat cttagtagtt ttgcttgata atgtatccat aaacagtact ttctgagata 461

gaataaagct ctcaact                                               478
```

<210> 33
<211> 472
<212> DNA
<213> Ancyclostoma caninum

<220>
<221> CDS
<222> (21)..(335)

<220>
<221> MOD_RES
<223> Recombinant cDNA Molecule AcaNAP25 sequence

<400> 33

```
gaattccgta ctactcaacg atg aag acg ctc tat att atc gct ata tgc     50
                       Met Lys Thr Leu Tyr Ile Ile Ala Ile Cys
                        1               5                  10
tcg ctg ctc ttt tca ctg tgt act gga aga ccg gaa aaa aag tgc ggt   98
Ser Leu Leu Phe Ser Leu Cys Thr Gly Arg Pro Glu Lys Lys Cys Gly
                15                  20                  25
ccc ggt gaa aga ctc gac tgt gcc aac aag aag cca tgc gag ccc aag   146
Pro Gly Glu Arg Leu Asp Cys Ala Asn Lys Lys Pro Cys Glu Pro Lys
            30                  35                  40
tgc aaa ata gag aca agt gag gag gag gat gac gac gta gag gat acc   194
Cys Lys Ile Glu Thr Ser Glu Glu Glu Asp Asp Asp Val Glu Asp Thr
        45                  50                  55
gat gtg aga tgc ctc gta cgt gtg tgt gaa cgt cct ctt aaa tgc ata   242
Asp Val Arg Cys Leu Val Arg Val Cys Glu Arg Pro Leu Lys Cys Ile
    60                  65                  70
tgc aag gat gga tac tac aga aac aag aaa ggc gaa tgt gtg act gat   290
Cys Lys Asp Gly Tyr Tyr Arg Asn Lys Lys Gly Glu Cys Val Thr Asp
 75                  80                  85                  90
gat gta tgc cag gaa gac ttt atg gag ttt att act ttc gca cca taaacc 341
Asp Val Cys Gln Glu Asp Phe Met Glu Phe Ile Thr Phe Ala Pro
                95                  100                 105
caataatgac cactggctcc cattcttcgt gatcagcgtc ggtggttgac agtctcccct 401

gcatcttagt tgctttgctt gataatctat acataaacag tactttctga gatagaataa 461

agctctcaac t                                                      472
```

<210> 34
<211> 487
<212> DNA
<213> Ancyclostoma caninum

<220>
<221> CDS
<222> (57)..(347)

<220>
<221> MOD_RES
<223> Recombinant cDNA Molecule AcaNAP31, AcaNAP42 and AcaNAP46 sequence

<400> 34

```
gaattccgga cttactagta ctcagcgaat caaatacgac ttactactac tcaacg atg 59
                                                              Met
                                                               1
aag acg ctc tct gct atc cct ata atg ctg ctc ctg gta tcg caa tgc   107
Lys Thr Leu Ser Ala Ile Pro Ile Met Leu Leu Leu Val Ser Gln Cys
             5                  10                  15
agt gga aaa tca ctg tgg gat cag aag tgt ggt gag aat gaa agg ctc   155
Ser Gly Lys Ser Leu Trp Asp Gln Lys Cys Gly Glu Asn Glu Arg Leu
         20                  25                  30
gac tgt ggc aat cag aag gac tgt gag cgc aag tgc gat gat aaa aga   203
Asp Cys Gly Asn Gln Lys Asp Cys Glu Arg Lys Cys Asp Asp Lys Arg
     35                  40                  45
agt gaa gaa gaa att atg cag gca tgt ctc aca cgt caa tgt ctt cct   251
Ser Glu Glu Glu Ile Met Gln Ala Cys Leu Thr Arg Gln Cys Leu Pro
50                  55                  60                  65
cct gtt tgc gta tgt gaa gat gga ttc tac aga aat gac aac gac caa   299
Pro Val Cys Val Cys Glu Asp Gly Phe Tyr Arg Asn Asp Asn Asp Gln
                 70                  75                  80
tgt gtt gat gaa gaa gaa tgc aat atg gag ttt att act ttc gcr cca tg 349
Cys Val Asp Glu Glu Glu Cys Asn Met Glu Phe Ile Thr Phe Ala Pro
            85                  90                  95
aagcaaatga cagccgatgg tttggactct cgctacagat cacagcttta ctgtttccct 409

tgcatcatag tagttttgct agatagtgta tatattagca tgattttctg atagggagaa 469

taaagctttc caattttc                                              487
```

<210> 35
<211> 477
<212> DNA
<213> Ancyclostoma caninum

<220>
<221> CDS
<222> (24)..(338)

<220>
<221> MOD_RES
<223> Recombinant cDNA Molecule AcaNAP44 sequence

<400> 35

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gaattccgcg gaattccgca acg atg aag acg ctc tat att atc gct ata tgc 53
                        Met Lys Thr Leu Tyr Ile Ile Ala Ile Cys
                         1               5                  10
tcg ctc ctc att tcg ctg tgt act gga aga ccg gaa aaa aag tgc ggt   101
Ser Leu Leu Ile Ser Leu Cys Thr Gly Arg Pro Glu Lys Lys Cys Gly
                15                  20                  25
ccc ggt gaa aga ctc gac tgt gcc aac aag aag cca tgc gag ccc aag   149
Pro Gly Glu Arg Leu Asp Cys Ala Asn Lys Lys Pro Cys Glu Pro Lys
            30                  35                  40
tgc aaa ata gag aca agt gag gag gag gat gac gac gta gag gaa acc   197
Cys Lys Ile Glu Thr Ser Glu Glu Glu Asp Asp Asp Val Glu Glu Thr
        45                  50                  55
gat gtg aga tgc ctc gta cgt gtg tgt gaa cgg cct ctt aaa tgc ata   245
Asp Val Arg Cys Leu Val Arg Val Cys Glu Arg Pro Leu Lys Cys Ile
    60                  65                  70
tgc aag gat gga tac tac aga aac aag aaa ggc gaa tgt gtg act gat   293
Cys Lys Asp Gly Tyr Tyr Arg Asn Lys Lys Gly Glu Cys Val Thr Asp
75                  80                  85                  90
gat gta tgc cag gaa gac ttt atg gag ttt att act ttc gca cca taaacc 344
Asp Val Cys Gln Glu Asp Phe Met Glu Phe Ile Thr Phe Ala Pro
                95                  100                 105
caataatgac cactggctcc cattcttcgt gatcagcgtc ggtggttgac agtctcccct 404

gcatcttagt tgctttgctt gataatctat acataaacag tactttctga gatagaataa 464

agctctcaac tac                                                    477
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<210> 36
<211> 685
<212> DNA
<213> Ancyclostoma caninum

<220>
<221> CDS
<222> (14)..(556)

<220>
<221> MOD_RES
<223> Recombinant cDNA Molecule AcaNAP45 sequence

<400> 36

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aattccgga aaa atg ctg atg ctc tac ctt gtt cct atc tgg ttg cta     48
              Met Leu Met Leu Tyr Leu Val Pro Ile Trp Leu Leu
               1               5                  10
ctc att tcg caa tgc agt gga aaa tcc gcg aag aaa tgt ggt ctc aat   96
Leu Ile Ser Gln Cys Ser Gly Lys Ser Ala Lys Lys Cys Gly Leu Asn
        15                  20                  25
gaa aaa ttg gac tgt ggc aat ctg aag gca tgc gag aaa aag tgc agc   144
Glu Lys Leu Asp Cys Gly Asn Leu Lys Ala Cys Glu Lys Lys Cys Ser
    30                  35                  40
gac ttg gac aat gag gag gat tat aag gag gaa gat gag tcg aaa tgc   192
Asp Leu Asp Asn Glu Glu Asp Tyr Lys Glu Glu Asp Glu Ser Lys Cys
45                  50                  55                  60
cga tca cgt gaa tgt agt cgt cgt gtt tgt gta tgc gat gaa gga ttc   240
Arg Ser Arg Glu Cys Ser Arg Arg Val Cys Val Cys Asp Glu Gly Phe
                65                  70                  75
tac aga aac aag aag ggc caa tgt gtg aca aga gat gat tgc gag tat   288
Tyr Arg Asn Lys Lys Gly Gln Cys Val Thr Arg Asp Asp Cys Glu Tyr
            80                  85                  90
gac aat atg gag att atc act ttt cca cca gaa gat aaa tgt ggt ccc   336
Asp Asn Met Glu Ile Ile Thr Phe Pro Pro Glu Asp Lys Cys Gly Pro
        95                  100                 105
gat gaa tgg ttc gac tgg tgt gga act tac aag cag tgt gag cgc aag   384
Asp Glu Trp Phe Asp Trp Cys Gly Thr Tyr Lys Gln Cys Glu Arg Lys
    110                 115                 120
tgc aat aag gag cta agt gag aaa gat gaa gag gca tgc ctc tca cgt   432
Cys Asn Lys Glu Leu Ser Glu Lys Asp Glu Glu Ala Cys Leu Ser Arg
125                 130                 135                 140
gct tgt act ggt cgt gct tgt gtt tgc aac gac gga ctg tac aga gac   480
Ala Cys Thr Gly Arg Ala Cys Val Cys Asn Asp Gly Leu Tyr Arg Asp
                145                 150                 155
gat ttt ggc aat tgt gtt gag aaa gac gaa tgt aac gat atg gag att   528
Asp Phe Gly Asn Cys Val Glu Lys Asp Glu Cys Asn Asp Met Glu Ile
            160                 165                 170
atc act ttt cca ccg gaa acc aaa cac tgaccaaagg ctctaactct cgctacat 583
Ile Thr Phe Pro Pro Glu Thr Lys His
        175                 180
aacgtcagtg cttgaattgc ccctttacga gttagtaatt ttgactaact ctgtgtaatt  643

gagcattgtc tactgatggt gaaaatgaag tgttcaatgt ct                    685
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<210> 37
<211> 707
<212> DNA
<213> Ancyclostoma caninum

<220>
<221> CDS
<222> (34)..(576)

<220>
<221> MOD_RES
<223> Recombinant cDNA Molecule AcaNAP47 sequence

<400> 37

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gaattccgcg gaattccggt tggcggcaga aaa atg ctg atg ctc tac ctt gtt  54
                                      Met Leu Met Leu Tyr Leu Val
                                       1               5
cct atc tgg ttc ctg ctc att tcg caa tgc agt gga aaa tcc gcg aag   102
Pro Ile Trp Phe Leu Leu Ile Ser Gln Cys Ser Gly Lys Ser Ala Lys
        10                  15                  20
aaa tgt ggc ctc aat gaa aaa ttg gac tgt ggc aat ctg aag gca tgc   150
Lys Cys Gly Leu Asn Glu Lys Leu Asp Cys Gly Asn Leu Lys Ala Cys
    25                  30                  35
gag aaa aag tgc agc gac ttg gac aat gag gag gat tat ggg gag gaa   198
Glu Lys Lys Cys Ser Asp Leu Asp Asn Glu Glu Asp Tyr Gly Glu Glu
40                  45                  50                  55
gat gag tcg aaa tgc cga tca cgt gaa tgt att ggt cgt gtt tgc gta   246
Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys Ile Gly Arg Val Cys Val
                60                  65                  70
tgc gat gaa gga ttc tac aga aac aag aag ggc caa tgt gtg aca aga   294
Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys Gly Gln Cys Val Thr Arg
            75                  80                  85
gac gat tgc gag tat gac aat atg gag att atc act ttt cca cca gaa   342
Asp Asp Cys Glu Tyr Asp Asn Met Glu Ile Ile Thr Phe Pro Pro Glu
        90                  95                  100
gat aaa tgt ggt ccc gat gaa tgg ttc gac tgg tgt gga act tac aag   390
Asp Lys Cys Gly Pro Asp Glu Trp Phe Asp Trp Cys Gly Thr Tyr Lys
    105                 110                 115
cag tgt gag cgc aag tgc agt gag gag cta agt gag aaa aat gag gag   438
Gln Cys Glu Arg Lys Cys Ser Glu Glu Leu Ser Glu Lys Asn Glu Glu
120                 125                 130                 135
gca tgc ctc tca cgt gct tgt act ggt cgt gct tgc gtt tgc aac gac   486
Ala Cys Leu Ser Arg Ala Cys Thr Gly Arg Ala Cys Val Cys Asn Asp
                140                 145                 150
gga ttg tat aga gac gat ttt ggc aat tgt gtt gag aaa gac gaa tgt   534
Gly Leu Tyr Arg Asp Asp Phe Gly Asn Cys Val Glu Lys Asp Glu Cys
            155                 160                 165
aac gat atg gag att atc act ttt cca ccg gaa acc aaa cac tgaccaaagg 586
Asn Asp Met Glu Ile Ile Thr Phe Pro Pro Glu Thr Lys His
        170                 175                 180
```

```
ctctagctct cgctacataa cgtcagtgct tgaattgtcc ctttacgtgt tagtaatttt 646

gactaactct gtgtatttga gcattgtcta ctaatggtga aaatgaagct tttcaatgac 706

t                                                                 707


<210>  38
<211>  529
<212>  DNA
<213>  Ancyclostoma caninum

<220>
<221>  CDS
<222>  (31)..(309)

<220>
<221>  MOD_RES
<223>  Recombinant cDNA Molecule AcaNAP48 sequence

<400>  38

gaattccgta cgacctacta ctactcaacg atg aag gcg ctc tat gtt atc tct  54
                                Met Lys Ala Leu Tyr Val Ile Ser
                                 1               5
ata acg ttg ctc ctg gta tgg caa tgc agt gca aga aca gcg agg aaa   102
Ile Thr Leu Leu Leu Val Trp Gln Cys Ser Ala Arg Thr Ala Arg Lys
    10                  15                  20
ccc cca acg tgt ggt gaa aat gaa agg gtc gaa tgg tgt ggc aag cag   150
Pro Pro Thr Cys Gly Glu Asn Glu Arg Val Glu Trp Cys Gly Lys Gln
 25                  30                  35                  40
tgc gag atc aca tgt gac gac cca gat aag ata tgc cgc tca ctc gct   198
Cys Glu Ile Thr Cys Asp Asp Pro Asp Lys Ile Cys Arg Ser Leu Ala
                45                  50                  55
tgt cct ggt cct cct gct tgc gta tgc gac gac gga tac tac aga gac   246
Cys Pro Gly Pro Pro Ala Cys Val Cys Asp Asp Gly Tyr Tyr Arg Asp
            60                  65                  70
acg aac gtt ggc ttg tgt gta caa tat gac gaa tgc aac gat atg gat   294
Thr Asn Val Gly Leu Cys Val Gln Tyr Asp Glu Cys Asn Asp Met Asp
        75                  80                  85
att att atg gtt tca tagggttgac tgaagaatcg aacaaccggt gcacaacttc   349
Ile Ile Met Val Ser
    90
tatgcttgac tatctctctt gcatcatgca agtttagcta gatagtgtat atattagcaa 409

gacccttgg ggagaatgaa gcttcccaac tatattaaat caataacgtt ttcgcttcat 469

gtacacgtgc tcagcacatt catatccact cctcacactc catgaaagca gtgaaatgtt 529
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<210> 39
<211> 361
<212> DNA
<213> Necator americanus

<220>
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<400> 39

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gccaactctt cgaac atg att cga ggc ctc gtt ctt ctt tct ctc ctg ttt  51
                Met Ile Arg Gly Leu Val Leu Leu Ser Leu Leu Phe
                 1               5                  10
tgc gtc act ttt gca gcg aag aga gat tgt cca gca aat gag gaa tgg   99
Cys Val Thr Phe Ala Ala Lys Arg Asp Cys Pro Ala Asn Glu Glu Trp
        15                  20                  25
agg gaa tgt ggc act cca tgt gaa cca aaa tgc aat caa ccg atg cca   147
Arg Glu Cys Gly Thr Pro Cys Glu Pro Lys Cys Asn Gln Pro Met Pro
    30                  35                  40
gat ata tgt act atg aat tgt atc gtc gat gtg tgt caa tgc aag gag   195
Asp Ile Cys Thr Met Asn Cys Ile Val Asp Val Cys Gln Cys Lys Glu
45                  50                  55                  60
gga tac aag cgt cat gaa acg aag gga tgc tta aag gaa gga tca gct   243
Gly Tyr Lys Arg His Glu Thr Lys Gly Cys Leu Lys Glu Gly Ser Ala
                65                  70                  75
gat tgt aaa taagttatca gaacgctcgt tttgtcttac attagatggg tgagctgatg 302
Asp Cys Lys

tatctgtcag ataaactctt tcttctaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaa  361
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<210> 40
<211> 77
<212> PRT
<213> Ancyclostoma caninum

<400> 40

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Lys Ala Tyr Pro Glu Cys Gly Glu Asn Glu Trp Leu Asp Asp Cys Gly
 1               5                  10                  15
Thr Gln Lys Pro Cys Glu Ala Lys Cys Asn Glu Glu Pro Pro Glu Glu
            20                  25                  30
Glu Asp Pro Ile Cys Arg Ser Arg Gly Cys Leu Leu Pro Pro Ala Cys
        35                  40                  45
Val Cys Lys Asp Gly Phe Tyr Arg Asp Thr Val Ile Gly Asp Cys Val
    50                  55                  60
Arg Glu Glu Glu Cys Asp Gln His Glu Ile Ile His Val
65                  70                  75
```

<210> 41
<211> 75
<212> PRT
<213> Ancyclostoma caninum

<400> 41

Lys Ala Tyr Pro Glu Cys Gly Glu Asn Glu Trp Leu Asp Val Cys Gly
1 5 10 15
Thr Lys Lys Pro Cys Glu Ala Lys Cys Ser Glu Glu Glu Glu Glu Asp
20 25 30
Pro Ile Cys Arg Ser Phe Ser Cys Pro Gly Pro Ala Ala Cys Val Cys
35 40 45
Glu Asp Gly Phe Tyr Arg Asp Thr Val Ile Gly Asp Cys Val Lys Glu
50 55 60
Glu Glu Cys Asp Gln His Glu Ile Ile His Val
65 70 75

<210> 42
<211> 74
<212> PRT
<213> Ancyclostoma caninum

<400> 42

Arg Thr Ala Arg Lys Pro Pro Thr Cys Gly Glu Asn Glu Arg Val Glu
1 5 10 15
Trp Cys Gly Lys Gln Cys Glu Ile Thr Cys Asp Asp Pro Asp Lys Ile
20 25 30
Cys Arg Ser Leu Ala Cys Pro Gly Pro Pro Ala Cys Val Cys Asp Asp
35 40 45
Gly Tyr Tyr Arg Asp Thr Asn Val Gly Leu Cys Val Gln Tyr Asp Glu
50 55 60
Cys Asn Asp Met Asp Ile Ile Met Val Ser
65 70

<210> 43
<211> 88
<212> PRT
<213> Ancyclostoma caninum

<400> 43

```
Lys Pro Ser Glu Lys Glu Cys Gly Pro His Glu Arg Leu Asp Cys Gly
1               5                  10                  15
Asn Lys Lys Pro Cys Glu Arg Lys Cys Lys Ile Glu Thr Ser Glu Glu
            20                  25                  30
Glu Asp Asp Tyr Glu Glu Gly Thr Glu Arg Phe Arg Cys Leu Leu Arg
        35                  40                  45
Val Cys Asp Gln Pro Tyr Glu Cys Ile Cys Asp Asp Gly Tyr Tyr Arg
    50                  55                  60
Asn Lys Lys Gly Glu Cys Val Thr Asp Asp Val Cys Gln Glu Asp Phe
65                  70                  75                  80
Met Glu Phe Ile Thr Phe Ala Pro
                85
```

<210> 44
<211> 87
<212> PRT
<213> Ancyclostoma caninum

<400> 44

```
Arg Pro Glu Lys Lys Cys Gly Pro Gly Glu Arg Leu Ala Cys Gly Asn
1               5                  10                  15
Lys Lys Pro Cys Glu Arg Lys Cys Lys Ile Glu Thr Ser Glu Glu Glu
            20                  25                  30
Asp Asp Tyr Pro Glu Gly Thr Glu Arg Phe Arg Cys Leu Leu Arg Val
        35                  40                  45
Cys Asp Gln Pro Tyr Glu Cys Ile Cys Asp Asp Gly Tyr Tyr Arg Asn
    50                  55                  60
Lys Lys Gly Glu Cys Val Thr Asp Asp Val Cys Gln Glu Asp Phe Met
65                  70                  75                  80
Glu Phe Ile Thr Phe Ala Pro
                85
```

<210> 45
<211> 86
<212> PRT
<213> Ancyclostoma caninum

<400> 45

```
Arg Pro Glu Lys Lys Cys Gly Pro Gly Glu Arg Leu Asp Cys Ala Asn
1               5                  10                  15
Lys Lys Pro Cys Glu Pro Lys Cys Lys Ile Glu Thr Ser Glu Glu Glu
            20                  25                  30
Asp Asp Asp Val Glu Asp Thr Asp Val Arg Cys Leu Val Arg Val Cys
        35                  40                  45
Glu Arg Pro Leu Lys Cys Ile Cys Lys Asp Gly Tyr Tyr Arg Asn Lys
    50                  55                  60
Lys Gly Glu Cys Val Thr Asp Asp Val Cys Gln Glu Asp Phe Met Glu
65                  70                  75                  80
Phe Ile Thr Phe Ala Pro
                85
```

<210> 46
<211> 86
<212> PRT
<213> Ancyclostoma caninum

<400> 46

```
Arg Pro Glu Lys Lys Cys Gly Pro Gly Glu Arg Leu Asp Cys Ala Asn
1               5                  10                  15
Lys Lys Pro Cys Glu Pro Lys Cys Lys Ile Glu Thr Ser Glu Glu Glu
            20                  25                  30
Asp Asp Asp Val Glu Glu Thr Asp Val Arg Cys Leu Val Arg Val Cys
        35                  40                  45
Glu Arg Pro Leu Lys Cys Ile Cys Lys Asp Gly Tyr Tyr Arg Asn Lys
    50                  55                  60
Lys Gly Glu Cys Val Thr Asp Asp Val Cys Gln Glu Asp Phe Met Glu
65                  70                  75                  80
Phe Ile Thr Phe Ala Pro
                85
```

<210> 47
<211> 78
<212> PRT
<213> Ancyclostoma caninum

<400> 47

```
Lys Ser Leu Trp Asp Gln Lys Cys Gly Glu Asn Glu Arg Leu Asp Cys
1               5                  10                  15
Gly Asn Gln Lys Asp Cys Glu Arg Lys Cys Asp Asp Lys Arg Ser Glu
            20                  25                  30
Glu Glu Ile Met Gln Ala Cys Leu Thr Arg Gln Cys Leu Pro Pro Val
        35                  40                  45
Cys Val Cys Glu Asp Gly Phe Tyr Arg Asn Asp Asn Asp Gln Cys Val
    50                  55                  60
Asp Glu Glu Glu Cys Asn Met Glu Phe Ile Thr Phe Ala Pro
65                  70                  75
```

<210> 48
<211> 89
<212> PRT
<213> Ancyclostoma ceylanicum

<400> 48

```
Lys Pro Asn Asn Val Met Thr Asn Ala Cys Gly Leu Asn Glu Tyr Phe
1               5                  10                  15
Ala Glu Cys Gly Asn Met Lys Glu Cys Glu His Arg Cys Asn Glu Glu
            20                  25                  30
Glu Asn Glu Glu Arg Asp Glu Glu Arg Ile Thr Ala Cys Leu Ile Arg
        35                  40                  45
Val Cys Phe Arg Pro Gly Ala Cys Val Cys Lys Asp Gly Phe Tyr Arg
    50                  55                  60
Asn Arg Thr Gly Ser Cys Val Glu Glu Asp Asp Cys Glu Tyr Glu Asn
65                  70                  75                  80
Met Glu Phe Ile Thr Phe Ala Pro Glu
                85
```

<210> 49
<211> 82
<212> PRT
<213> Ancyclostoma ceylanicum

<400> 49

```
Val Pro Ile Cys Gly Ser Asn Glu Arg Tyr Ser Asp Cys Gly Asn Asp
1               5                  10                  15
Lys Gln Cys Glu Arg Lys Cys Asn Glu Asp Asp Tyr Glu Lys Gly Asp
            20                  25                  30
Glu Ala Cys Arg Ser His Val Cys Glu Arg Pro Gly Ala Cys Val Cys
        35                  40                  45
Glu Asp Gly Phe Tyr Arg Asn Lys Lys Gly Ser Cys Val Glu Ser Asp
    50                  55                  60
Asp Cys Glu Tyr Asp Asn Met Asp Phe Ile Thr Phe Ala Pro Glu Thr
65                  70                  75                  80
Ser Arg
```

<210> 50
<211> 84
<212> PRT
<213> Ancyclostoma caninum

<400> 50

```
Lys Ser Ala Lys Lys Cys Gly Leu Asn Glu Lys Leu Asp Cys Gly Asn
1               5                  10                  15
Leu Lys Ala Cys Glu Lys Lys Cys Ser Asp Leu Asp Asn Glu Glu Asp
            20                  25                  30
Tyr Lys Glu Glu Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys Ser Arg
        35                  40                  45
Arg Val Cys Val Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys Gly Gln
    50                  55                  60
Cys Val Thr Arg Asp Asp Cys Glu Tyr Asp Asn Met Glu Ile Ile Thr
65                  70                  75                  80
Phe Pro Pro Glu
```

<210> 51
<211> 84
<212> PRT
<213> Ancyclostoma caninum

<400> 51

```
Lys Ser Ala Lys Lys Cys Gly Leu Asn Glu Lys Leu Asp Cys Gly Asn
1               5                  10                  15
Leu Lys Ala Cys Glu Lys Lys Cys Ser Asp Leu Asp Asn Glu Glu Asp
            20                  25                  30
Tyr Gly Glu Glu Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys Ile Gly
        35                  40                  45
Arg Val Cys Val Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys Gly Gln
    50                  55                  60
Cys Val Thr Arg Asp Asp Cys Glu Tyr Asp Asn Met Glu Ile Ile Thr
65                  70                  75                  80
Phe Pro Pro Glu
```

<210> 52
<211> 83
<212> PRT
<213> Ancyclostoma duodenale

<400> 52

```
Lys Ala Ala Lys Lys Cys Gly Leu Asn Glu Arg Leu Asp Cys Gly Asn
1               5                  10                  15
Leu Lys Gln Cys Glu Pro Lys Cys Ser Asp Leu Glu Ser Glu Glu Tyr
            20                  25                  30
Glu Glu Glu Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys Ser Arg Arg
        35                  40                  45
Val Cys Val Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys Gly Lys Cys
    50                  55                  60
Val Ala Lys Asp Val Cys Glu Asp Asp Asn Met Glu Ile Ile Thr Phe
65                  70                  75                  80
Pro Pro Glu
```

<210> 53
<211> 78
<212> PRT
<213> Ancyclostoma caninum

<400> 53

Asp Lys Cys Gly Pro Asp Glu Trp Phe Asp Trp Cys Gly Thr Tyr Lys
1 5 10 15
Gln Cys Glu Arg Lys Cys Asn Lys Glu Leu Ser Glu Lys Asp Glu Glu
20 25 30
Ala Cys Leu Ser Arg Ala Cys Thr Gly Arg Ala Cys Val Cys Asn Asp
35 40 45
Gly Leu Tyr Arg Asp Asp Phe Gly Asn Cys Val Glu Lys Asp Glu Cys
50 55 60
Asn Asp Met Glu Ile Ile Thr Phe Pro Pro Glu Thr Lys His
65 70 75

<210> 54
<211> 78
<212> PRT
<213> Ancyclostoma caninum

<400> 54

Asp Lys Cys Gly Pro Asp Glu Trp Phe Asp Trp Cys Gly Thr Tyr Lys
1 5 10 15
Gln Cys Glu Arg Lys Cys Ser Glu Glu Leu Ser Glu Lys Asn Glu Glu
20 25 30
Ala Cys Leu Ser Arg Ala Cys Thr Gly Arg Ala Cys Val Cys Asn Asp
35 40 45
Gly Leu Tyr Arg Asp Asp Phe Gly Asn Cys Val Glu Lys Asp Glu Cys
50 55 60
Asn Asp Met Glu Ile Ile Thr Phe Pro Pro Glu Thr Lys His
65 70 75

<210> 55
<211> 77
<212> PRT
<213> Ancyclostoma duodenale

<400> 55

```
Lys Cys Pro Thr Asp Glu Trp Phe Asp Trp Cys Gly Thr Tyr Lys His
1               5                  10                  15
Cys Glu Leu Lys Cys Asp Arg Glu Leu Thr Glu Lys Glu Glu Gln Ala
            20                  25                  30
Cys Leu Ser Arg Val Cys Glu Lys Ser Ala Cys Val Cys Asn Asp Gly
        35                  40                  45
Leu Tyr Arg Asp Lys Phe Gly Asn Cys Val Glu Lys Asp Glu Cys Asn
    50                  55                  60
Asp Met Glu Ile Ile Thr Phe Ala Pro Glu Glu Thr Lys
65                  70                  75
```

<210> 56
<211> 78
<212> PRT
<213> Ancyclostoma duodenale

<400> 56

```
Asp Glu Cys Gly Pro Asp Glu Trp Phe Asp Tyr Cys Gly Asn Tyr Lys
1               5                  10                  15
Lys Cys Glu Arg Lys Cys Ser Glu Glu Thr Ser Glu Lys Asn Glu Glu
            20                  25                  30
Ala Cys Leu Ser Arg Ala Cys Thr Gly Arg Ala Cys Val Cys Lys Asp
        35                  40                  45
Gly Leu Tyr Arg Asp Asp Phe Gly Asn Cys Val Pro His Asp Glu Cys
    50                  55                  60
Asn Asp Met Glu Ile Ile Thr Phe Pro Pro Glu Thr Lys His
65                  70                  75
```

<210> 57
<211> 75
<212> PRT
<213> Ancyclostoma ceylanicum

<400> 57

```
Lys Ala Phe Pro Lys Cys Asp Val Asn Glu Arg Phe Glu Val Cys Gly
1               5                  10                  15
Asn Leu Lys Glu Cys Glu Leu Lys Cys Asp Glu Asp Pro Lys Ile Cys
            20                  25                  30
Ser Arg Ala Cys Ile Arg Pro Pro Ala Cys Val Cys Asp Asp Gly Phe
        35                  40                  45
Tyr Arg Asp Lys Tyr Gly Phe Cys Val Glu Glu Asp Glu Cys Asn Asp
    50                  55                  60
Met Glu Ile Ile Thr Phe Pro Pro Glu Thr Lys
65                  70                  75
```

<210> 58
<211> 77
<212> PRT
<213> Ancyclostoma ceylanicum

<400> 58

```
Arg Thr Val Lys Lys Cys Gly Lys Asn Glu Arg Tyr Asp Asp Cys Gly
1               5                  10                  15
Asn Ala Lys Asp Cys Glu Thr Lys Cys Gly Glu Glu Glu Lys Val Cys
            20                  25                  30
Arg Ser Arg Glu Cys Thr Ser Pro Gly Ala Cys Val Cys Glu Gln Gly
        35                  40                  45
Phe Tyr Arg Asp Pro Ala Gly Asp Cys Val Thr Asp Glu Glu Cys Asp
    50                  55                  60
Glu Trp Asn Asn Met Glu Ile Ile Thr Met Pro Lys Gln
65                  70                  75
```

<210> 59
<211> 84
<212> PRT
<213> Ancyclostoma caninum

<400> 59

```
Lys Ala Thr Met Gln Cys Gly Glu Asn Glu Lys Tyr Asp Ser Cys Gly
1               5                  10                  15
Ser Lys Glu Cys Asp Lys Lys Cys Lys Tyr Asp Gly Val Glu Glu Glu
            20                  25                  30
Asp Asp Glu Glu Pro Asn Val Pro Cys Leu Val Arg Val Cys His Gln
        35                  40                  45
Asp Cys Val Cys Glu Glu Gly Phe Tyr Arg Asn Lys Asp Asp Lys Cys
    50                  55                  60
Val Ser Ala Glu Asp Cys Glu Leu Asp Asn Met Asp Phe Ile Tyr Pro
65                  70                  75                  80
Gly Thr Arg Asn
```

<210> 60
<211> 58
<212> PRT
<213> Heligmosomoides polygyrus

<400> 60

```
Lys Thr Cys Gly Pro Asn Glu Glu Tyr Thr Glu Cys Gly Thr Pro Cys
1               5                  10                  15
Glu Pro Lys Cys Asn Glu Pro Met Pro Asp Ile Cys Thr Leu Asn Cys
            20                  25                  30
Ile Val Asn Val Cys Gln Cys Lys Pro Gly Phe Lys Arg Gly Pro Lys
        35                  40                  45
Gly Cys Val Ala Pro Gly Pro Gly Cys Lys
    50                  55
```

<210> 61
<211> 61
<212> PRT
<213> Necator americanus

<400> 61

```
Lys Arg Asp Cys Pro Ala Asn Glu Glu Trp Arg Glu Cys Gly Thr Pro
1               5                  10                  15
Cys Glu Pro Lys Cys Asn Gln Pro Met Pro Asp Ile Cys Thr Met Asn
            20                  25                  30
Cys Ile Val Asp Val Cys Gln Cys Lys Glu Gly Tyr Lys Arg His Glu
        35                  40                  45
Thr Lys Gly Cys Leu Lys Glu Gly Ser Ala Asp Cys Lys
    50                  55                  60
```

<210> 62
<211> 171
<212> PRT
<213> Ancyclostoma ceylanicum

<400> 62

```
Lys Pro Asn Asn Val Met Thr Asn Ala Cys Gly Leu Asn Glu Tyr Phe
1               5                  10                  15
Ala Glu Cys Gly Asn Met Lys Glu Cys Glu His Arg Cys Asn Glu Glu
            20                  25                  30
Glu Asn Glu Glu Arg Asp Glu Glu Arg Ile Thr Ala Cys Leu Ile Arg
        35                  40                  45
Val Cys Phe Arg Pro Gly Ala Cys Val Cys Lys Asp Gly Phe Tyr Arg
    50                  55                  60
Asn Arg Thr Gly Ser Cys Val Glu Glu Asp Asp Cys Glu Tyr Glu Asn
65                  70                  75                  80
Met Glu Phe Ile Thr Phe Ala Pro Glu Val Pro Ile Cys Gly Ser Asn
                85                  90                  95
Glu Arg Tyr Ser Asp Cys Gly Asn Asp Lys Gln Cys Glu Arg Lys Cys
            100                 105                 110
Asn Glu Asp Asp Tyr Glu Lys Gly Asp Glu Ala Cys Arg Ser His Val
        115                 120                 125
Cys Glu Arg Pro Gly Ala Cys Val Cys Glu Asp Gly Phe Tyr Arg Asn
    130                 135                 140
Lys Lys Gly Ser Cys Val Glu Ser Asp Asp Cys Glu Tyr Asp Asn Met
145                 150                 155                 160
Asp Phe Ile Thr Phe Ala Pro Glu Thr Ser Arg
                165                 170
```

<210> 63
<211> 162
<212> PRT
<213> Ancyclostoma caninum

<400> 63

```
Lys Ser Ala Lys Lys Cys Gly Leu Asn Glu Lys Leu Asp Cys Gly Asn
1               5                  10                  15
Leu Lys Ala Cys Glu Lys Lys Cys Ser Asp Leu Asp Asn Glu Glu Asp
            20                  25                  30
Tyr Lys Glu Glu Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys Ser Arg
        35                  40                  45
Arg Val Cys Val Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys Gly Gln
    50                  55                  60
Cys Val Thr Arg Asp Asp Cys Glu Tyr Asp Asn Met Glu Ile Ile Thr
65                  70                  75                  80
Phe Pro Pro Glu Asp Lys Cys Gly Pro Asp Glu Trp Phe Asp Trp Cys
                85                  90                  95
Gly Thr Tyr Lys Gln Cys Glu Arg Lys Cys Asn Lys Glu Leu Ser Glu
            100                 105                 110
```

```
Lys Asp Glu Glu Ala Cys Leu Ser Arg Ala Cys Thr Gly Arg Ala Cys
        115                 120                 125
Val Cys Asn Asp Gly Leu Tyr Arg Asp Asp Phe Gly Asn Cys Val Glu
    130                 135                 140
Lys Asp Glu Cys Asn Asp Met Glu Ile Ile Thr Phe Pro Pro Glu Thr
145                 150                 155                 160
Lys His
```

<210> 64
<211> 162
<212> PRT
<213> Ancyclostoma caninum

<400> 64

```
Lys Ser Ala Lys Lys Cys Gly Leu Asn Glu Lys Leu Asp Cys Gly Asn
1               5                   10                  15
Leu Lys Ala Cys Glu Lys Lys Cys Ser Asp Leu Asp Asn Glu Glu Asp
            20                  25                  30
Tyr Gly Glu Glu Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys Ile Gly
        35                  40                  45
Arg Val Cys Val Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys Gly Gln
    50                  55                  60
Cys Val Thr Arg Asp Asp Cys Glu Tyr Asp Asn Met Glu Ile Ile Thr
65                  70                  75                  80
Phe Pro Pro Glu Asp Lys Cys Gly Pro Asp Glu Trp Phe Asp Trp Cys
                85                  90                  95
Gly Thr Tyr Lys Gln Cys Glu Arg Lys Cys Ser Glu Glu Leu Ser Glu
            100                 105                 110
Lys Asn Glu Glu Ala Cys Leu Ser Arg Ala Cys Thr Gly Arg Ala Cys
        115                 120                 125
Val Cys Asn Asp Gly Leu Tyr Arg Asp Asp Phe Gly Asn Cys Val Glu
    130                 135                 140
Lys Asp Glu Cys Asn Asp Met Glu Ile Ile Thr Phe Pro Pro Glu Thr
145                 150                 155                 160
Lys His
```

<210> 65
<211> 161
<212> PRT
<213> Ancyclostoma duodenale

<400> 65

```
Lys Ala Ala Lys Lys Cys Gly Leu Asn Glu Arg Leu Asp Cys Gly Asn
1               5                   10                  15
Leu Lys Gln Cys Glu Pro Lys Cys Ser Asp Leu Glu Ser Glu Glu Tyr
            20                  25                  30
Glu Glu Glu Asp Glu Ser Lys Cys Arg Ser Arg Glu Cys Ser Arg Arg
        35                  40                  45
Val Cys Val Cys Asp Glu Gly Phe Tyr Arg Asn Lys Lys Gly Lys Cys
    50                  55                  60
```

```
Val Ala Lys Asp Val Cys Glu Asp Asp Asn Met Glu Ile Ile Thr Phe
65                  70                  75                  80
Pro Pro Glu Asp Glu Cys Gly Pro Asp Glu Trp Phe Asp Tyr Cys Gly
                85                  90                  95
Asn Tyr Lys Lys Cys Glu Arg Lys Cys Ser Glu Glu Thr Ser Glu Lys
            100                 105                 110
Asn Glu Glu Ala Cys Leu Ser Arg Ala Cys Thr Gly Arg Ala Cys Val
        115                 120                 125
Cys Lys Asp Gly Leu Tyr Arg Asp Asp Phe Gly Asn Cys Val Pro His
    130                 135                 140
Asp Glu Cys Asn Asp Met Glu Ile Ile Thr Phe Pro Pro Glu Thr Lys
145                 150                 155                 160
His
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<210> 66
<211> 9
<212> PRT
<213> Ancyclostoma caninum

<220>
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<222> (2)
<223> Xaa is any amino acid

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<400> 66

Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 67
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<213> Ancyclostoma caninum

<220>
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<220>
<221> MISC_FEATURE
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<400> 67

Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 68
<211> 7
<212> PRT
<213> Ancyclostoma caninum

<220>
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<222> (1)
<223> Xaa is any amino acid, provided that at least one of Xaa at location 1 is Glu or Asp

<220>
<221> MISC_FEATURE
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<223> Xaa is any amino acid, provided that at least one of Xaa at location 1 is Glu or Asp

<220>
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<223> Xaa is any amino acid

<220>
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<400> 68

Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 69
<211> 5
<212> PRT
<213> Ancyclostoma caninum

<400> 69

Gly Phe Tyr Arg Asp
1 5

<210> 70
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<212> PRT
<213> Ancyclostoma caninum

<400> 70

Gly Phe Tyr Arg Asn
1 5

<210> 71
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<213> Ancyclostoma caninum

<400> 71

Gly Tyr Tyr Arg Asp
1 5

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Gly Tyr Tyr Arg Asn
1 5

<210> 73
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<400> 73

Gly Leu Tyr Arg Asp
1 5

<210> 74
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<213> Ancyclostoma caninum

<400> 74

Glu Ile Ile His Val
1 5

<210> 75
<211> 5
<212> PRT
<213> Ancyclostoma caninum

<400> 75

Asp Ile Ile Met Val
1 5

<210> 76
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<400> 76

Phe Ile Thr Phe Ala Pro
1 5

<210> 77
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<212> PRT
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<400> 77

Met Glu Ile Ile Thr
1 5

<210> 78
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<220>
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<220>
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<223> Xaa is any amino acid, provided that at least one Xaa is Glu or Asp

<400> 78

Xaa Xaa Gly Phe Tyr Arg Asp
1 5

<210> 79
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<212> PRT
<213> Ancyclostoma caninum

<220>
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<220>
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<400> 79

Xaa Xaa Gly Phe Tyr Arg Asn
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<210> 80
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<400> 80

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<210> 81
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<400> 81

Xaa Xaa Gly Tyr Tyr Arg Asn
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<210> 82
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<400> 82

Xaa Xaa Gly Leu Tyr Arg Asp
1 5

<210> 83
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<400> 83

Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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<400> 87

Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 88
<211> 25
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<213> Ancyclostoma caninum

<400> 88

tcagacatgt ataatctcat gttgg 25

<210> 89
<211> 22
<212> DNA
<213> Ancyclostoma caninum

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<223> Oligonucleotide primer YG101

<400> 89

aaggcatacc cggagtgtgc tg 22

<210> 90
<211> 21
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<222> (3)
<223> "r" stands for a or g

<220>
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<222> (6)
<223> "n" stands for any base

<220>
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<222> (9)
<223> "y" stands for c or t

<220>
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<222> (12)
<223> "r" stands for a or g

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<222> (13)
<223> "m" stands for a or c

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<222> (18)
<223> "n" stands for any base

<220>
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<222> (21)
<223> "y" stands for c or t

<400> 90

aarccntgyg armggaartg y 21

<210> 91
<211> 23
<212> DNA
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<222> (2)
<223> "w" stands for a or t

<220>
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<222> (3)
<223> "r" stands for a or g

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<222> (4)
<223> "w" stands for a or t

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<222> (6)
<223> "n" stands for any base

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<221> Modified_base
<222> (9)
<223> "r" stands for a or g

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<222> (12)
<223> "y" stands for c or t

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<221> Modified_base
<222> (15)
<223> "r" stands for a or g

<220>
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<222> (18)
<223> "r" stands for a or g

<220>
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<223> "r" stands for a or g

<400> 91

twrwanccnt cyttrcanac rca 23

<210> 92
<211> 13
<212> PRT
<213> Ancyclostoma caninum

<400> 92

Lys Ala Tyr Pro Glu Cys Gly Glu Asn Glu Trp Leu Asp
1 5 10

<210> 93
<211> 11
<212> PRT
<213> Ancyclostoma caninum

<400> 93

Lys Ala Tyr Pro Glu Cys Gly Glu Asn Glu Trp
1 5 10

<210> 94
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<212> DNA
<213> Ancyclostoma caninum

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<223> "r" stands for a or g

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<223> "n" stands for Inosine

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<223> "y" stands for c or t

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<223> "r" stands for a or g

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<223> "y" stands for c or t

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<222> (21)
<223> "r" stands for a or g

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<223> "r" stands for a or g

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<222> (27)
<223> "y" stands for c or t

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<221> Modified_base
<222> (30)
<223> "r" stands for a or g

<400> 94

aargcntayc cngartgygg ngaraaygar tgg 33

<210> 95
<211> 28
<212> DNA
<213> Ancyclostoma caninum

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<221> misc_feature
<223> Oligonucleotide primer

<400> 95

aattcgcggc cgctttttt tttttttt 28

<210> 96
<211> 24
<212> DNA
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<400> 96

ggtggcgacg actcctggag cccg 24

<210> 97
<211> 20
<212> PRT
<213> Ancyclostoma caninum

<400> 97

Cys Ala Tyr Pro Glu Cys Gly Glu Asn Glu Trp Leu Asp Asp Cys Gly Thr
1 5 10 15
Gln Lys Pro
20

<210> 98
<211> 10
<212> DNA
<213> Ancyclostoma caninum

<400> 98

cggaattccg 10

<210> 99
<211> 18
<212> DNA
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<400> 99

tggcctagcg tcaggagt 18

<210> 100
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<212> DNA
<213> Ancyclostoma caninum

<400> 100

cctgacgcta ggccatgg 18

<210> 101
<211> 24
<212> DNA
<213> Ancyclostoma caninum

<400> 101

agcggataac aatttcacac agga 24

<210> 102
<211> 66
<212> DNA
<213> Ancyclostoma caninum

<400> 102

atgttctctc caattttgtc cttggaaatt attttagctt tggctacttt gcaatctgtc 60
ttcgct 66

<210> 103
<211> 57
<212> DNA
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<400> 103

cagccaggta tctccactac cgttggttcc gctgccgagg gttctttgga caagagg 57

<210> 104
<211> 51
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<400> 104

cctatccgcg gaattcagat ctgaatgcgg ccgctcgaga ctagtggatc c 51

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gctcgctcta gaagcttcag acatgtataa tctcatgttg g 41

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<211> 5
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<213> Ancyclostoma caninum

<400> 106

Lys Ala Tyr Pro Glu
1 5

<210> 107
<211> 36
<212> DNA
<213> Ancyclostoma caninum

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<223> Oligonucleotide primer YG102

<400> 107

gaccagtcta gacaatgaag atgctttacg ctatcg 36

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<211> 23
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<400> 108

gtgggagacc tgatactctc aag 23

<210> 109
<211> 9
<212> PRT
<213> Ancyclostoma caninum

<400> 109

Arg Thr Val Arg Lys Ala Tyr Pro Glu
1 5

<210> 110
<211> 5
<212> PRT
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<400> 110

Arg Thr Val Arg Lys
1 5

<210> 111
<211> 33
<212> DNA
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<223> Description of Artificial Sequence: pDONG vector
amplified PCR primer fragment

<400> 111

atccgaagct ttgctaacat actgcgtaat aag 33

<210> 112
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
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<223> Description of Artificial Sequence: pDONG vector
amplified PCR primer fragment

<400> 112

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<210> 113
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
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amplified PCR primer fragment

<400> 113

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<210> 114
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
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<223> Description of Artificial Sequence: pDONG vector
amplified PCR primer fragment

<400> 114

tatgggatgg ccgacttggc cgatccgcct gagcctccac ctttatccca atccaaataa 60

<210> 115
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
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<223> Description of Artificial Sequence: pDONG vector
amplified PCR primer fragment

<400> 115

aggaggggat ccgcggccgc gtgatatggg atggccgact tggcc 45

<210> 116
<211> 24
<212> DNA
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<220>
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<223> Description of Artificial Sequence: pUC119 primer

<400> 116

cgccagggtt ttcccagtca cgac 24

<210> 117
<211> 28
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<400> 117

gtttcgagtt ccgggatata taaagtcc 28

<210> 118
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<223> Xaa is Arg, Pro or Lys

<400> 118

Lys Pro Cys Glu Xaa Lys Cys
1 5

<210> 119
<211> 8
<212> PRT
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<220>
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<223> Xaa is Asp or Glu

<220>
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<222> (7)
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Cys Xaa Cys Xaa Xaa Gly Xaa Tyr
1 5

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<211> 44
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gaccagtcta gaccaccatg gcggtgcttt attcagtagc aata 44

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<400> 121

gctcgctcta gattatcgtg aggtttctgg tgcaaaagtg 40

<210> 122
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<213> Ancyclostoma caninum

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<400> 122

aaagcaacga tgcagtgtgg tgag 24

<210> 123
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<400> 123

gctcgctcta gaagcttcag tttcgagttc cgggatatat aaagtcc 47

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gagactttta aatcactgtc ggatcagaag 30

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ttcaggacta gttcatggtg cgaaagtaat aaa 33

<210> 126
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gcgtttaaag caacgatgca gtgtggtg 28

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<210> 128
<211> 91
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<400> 128

Leu Val Ser Tyr Cys Ser Gly Lys Ala Thr Met Gln Cys Gly Glu Asn
1 5 10 15
Glu Lys Tyr Asp Ser Cys Gly Ser Lys Glu Cys Asp Lys Lys Cys Lys
20 25 30
Tyr Asp Gly Val Glu Glu Glu Asp Asp Glu Glu Pro Asn Val Pro Cys
35 40 45
Leu Val Arg Val Cys His Gln Asp Cys Val Cys Glu Glu Gly Phe Tyr
50 55 60
Arg Asn Lys Asp Asp Lys Cys Val Ser Ala Glu Asp Cys Glu Leu Asp
65 70 75 80
Asn Met Asp Phe Ile Tyr Pro Gly Thr Arg Asn
85 90

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<400> 129

Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

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<223> Xaa is any amino acid

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Cys Xaa Xaa Xaa Xaa Xaa Cys
1 5

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<400> 131

Cys Xaa Xaa Xaa Xaa Cys
1 5

<210> 132
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Cys Xaa Xaa Xaa Cys
1 5

<210> 133
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<400> 133

Cys Xaa Xaa Cys
1

<210> 134
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1 5 10 15

Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa
20

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<400> 136

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1 5 10 15

Xaa Xaa Xaa

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1 5 10 15

Xaa Xaa

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1 5 10 15

Xaa

<210> 139
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<400> 139

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<210> 140
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1 5 10 15

<210> 141
<211> 14
<212> PRT
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1 5 10

<210> 142
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1 5 10

<210> 143
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1 5 10

<210> 144
<211> 11
<212> PRT
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Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 145
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Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 146
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<212> PRT
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Xaa Xaa Xaa Xaa Xaa
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Xaa

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Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa

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Xaa Xaa

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20 25

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Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa
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Xaa

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1